

**Progress Report
to the
Arctic Council's Senior Arctic Officials
Espoo, Finland
November 6-7, 2001**

ARCTIC CLIMATE IMPACT ASSESSMENT (ACIA)

Objective:

Climate variability and change, and more recently, notable increases in UV radiation, have become important issues in the Arctic over the past few decades. It has become imperative to examine possible future impacts on the environment and its living resources, on human health, and on relevant economic sectors. The Arctic Climate Impact Assessment is expected to lead to useful information for the nations of the Arctic region, their economy, resources, and peoples. The assessment will be open and transparent and the review of its conclusions is intended to be credible and rigorous; also the degree of uncertainty of the conclusions will be made clear.

Specific Areas to be Addressed by the Assessment:

- What are the past and present indicators of changes in climate and UV radiation?
- What are the possible changes in the future?
- What are the potential impacts due to changes in climate and UV in the future?

ACIA Products:

Three major volumes will be completed by 2004; they are a peer-reviewed scientific volume, a synthesis document summarizing results, and a policy document providing recommendations for coping and adaptation measures. The sixteen chapters of the scientific volume of the assessment are organized under five major headings:

- I. Introduction and Overview
- II. The Arctic as Part of the Global Climate System
- III. Physical and Biological Systems and their Response to Climate Change
- IV. Impacts of Climate and UV Changes on Humans and their Activities
- V. Synthesis

Lead and Contributing Authors:

Broad participation of experts from many different disciplines and countries in the writing of these documents has now been established. The writing is being done by lead and contributing authors, guided by the ACIA Assessment Steering Committee (ASC). About 180 lead and co-lead authors, contributing authors, and consulting authors have been selected, from all Arctic countries. Several first workshops of the chapter writing groups have taken place already and most of the others will occur by the end of 2001.

Themes and Lead Authors:

Climate Change & UV Radiation	Gordon McBean Elizabeth Weatherhead Petteri Taalas	Canada USA Finland
Modeling/Scenarios	Vladimir Kattsov Erland Källén S	Russia Sweden
Snow, Ice, Permafrost	John Walsh	USA
Terrestrial Systems	Terry Callaghan	Sweden
Freshwater Systems	Jim Reist Fred Wrona	Canada Canada
Ocean/Marine Systems	Harald Loeng	Norway
Indigenous People	Henry Huntington	USA
Wildlife Conservation	David Klein	USA
Subsistence	Mark Nuttall	United Kingdom
Fisheries/Aquaculture	Hjalmar Vilhjalmsón Alf Håkon Hoel	Iceland Norway
Forestry/Agriculture	Glenn Juday	USA

Human Health	James Berner	USA
Infrastructure	Arne Instanes	Norway

Summary of Participation of Authors by Country:

USA	45
Canada	32
Norway	21
Russia	19
Sweden	17
Denmark	15
Iceland	13
Finland	10
UK	3
Germany	2
Netherlands	1
<i>Total</i>	<u>178</u>

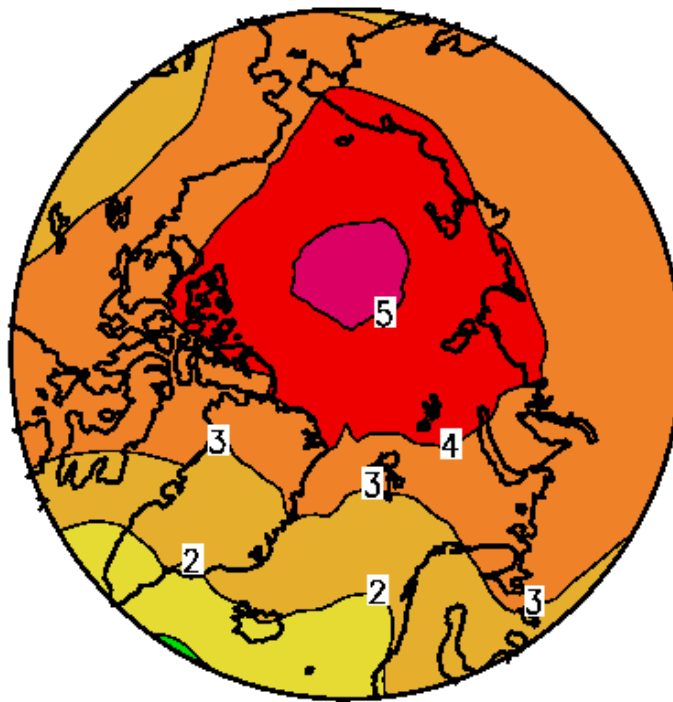
Workshops by the Chapter Teams to Develop the Assessment:

ACIA Workshops Schedule

Chapter 2,3,4	Modeling/scenarios	29–31 Jan. 2001	Stockholm
Chapter 8	Marine Ecosystems	17–19 Jan. 2001	Copenhagen
Chapter 6	Terrestrial Ecosystems	30–31 Mar. 2001	Lund
Chapter 2,3,4	Modeling/scenarios	16–19 Aug. 2001	Hadley Center
Chapter 14	Health	4–5 Oct. 2001	Copenhagen
Chapter 5	Cryosphere	25–27 Oct. 2001	Rovaniemi
Chapter 7	Freshwater Systems	3–5 Nov. 2001	Winnipeg
Chapter 8	Marine Systems (2nd mtg)	19–21 Nov. 2001	Victoria, BC
Chapter 15	Infrastructure	19–21 Nov. 2001	Anchorage
Chapter 6	Terrestrial Ecosys. (2nd mtg)	31 Jan.–3 Feb. 2002	Woods Hole
Chapter 9	Indigenous Perspectives	TBD (Spring 2002)	
Chapter 10	Wildlife	TBD (Spring 2002)	
Chapter 11	Subsistence	TBD	
Chapter 12	Fisheries	TBD	
Chapter 13	Agriculture	TBD	

Climate Scenarios:

At an ACIA workshop in Stockholm in January 2001 agreement was reached on the climate models and scenarios to be used. The ACIA is using a single IPCC-type scenario, i.e. the SRES B2 scenario. B2 is a "moderate" climate change scenario and it contains projections out to the year 2100. The B2 scenario is being implemented on five climate models that are readily available to scientists in North American and European centers: Canadian Climate Center, NCAR, GFDL, Hadley Center, and Max Planck Institute. Time slices around 2020, 2050 and 2080 are being used, which are the ones also used by the IPCC.



Changes in annual mean temperature ($^{\circ}\text{C}$) for a doubling of CO_2 , from a composite of 19 General Circulation Models (ACIA Stockholm Report).

Timetable of Report Production—Scientific Document:

<u>Stages</u>	<u>Target Dates</u>	<u>Comments</u>
<i>1. Writing Group Draft Production and Review</i>		
First Draft	3rd Quarter 2002	
Circulation	4th Quarter 2002	ACIA internal review
Comments	1st Quarter 2003	
<i>2. ACIA Overall Report Production and Review</i>		
Second Draft	2nd Quarter 2003	
Circulation	2nd Quarter 2003	AMAP, CAFF, IARC review

Comments 3rd Quarter 2003

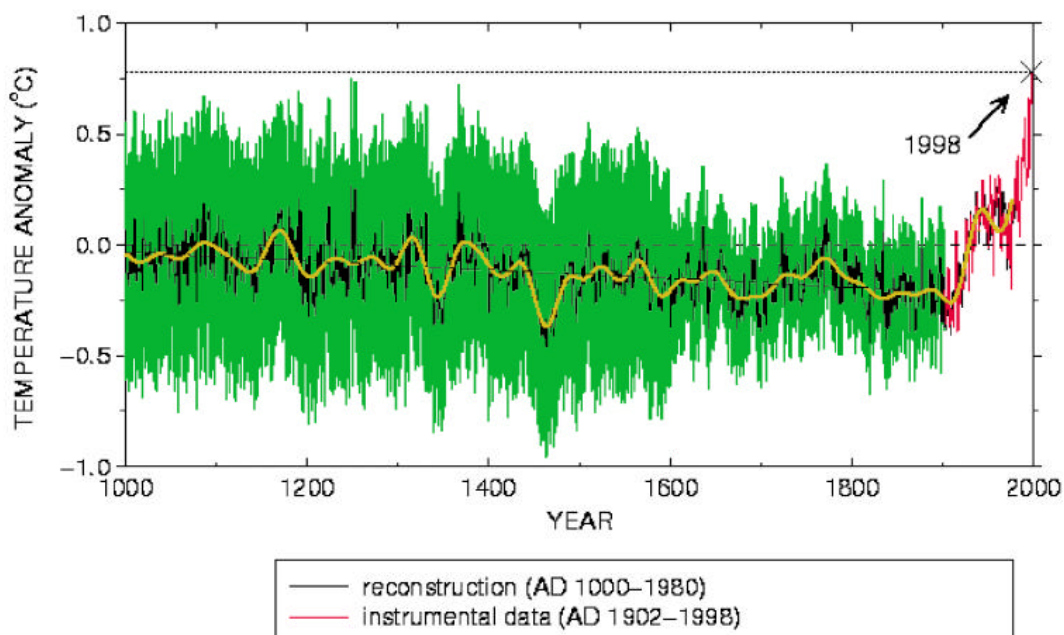
3. Final External Review and Report Production

External Review	4th Quarter 2003	International external review
Final Report	1st Quarter 2004	
Editing	2nd Quarter 2004	
Printing	3rd Quarter 2004	

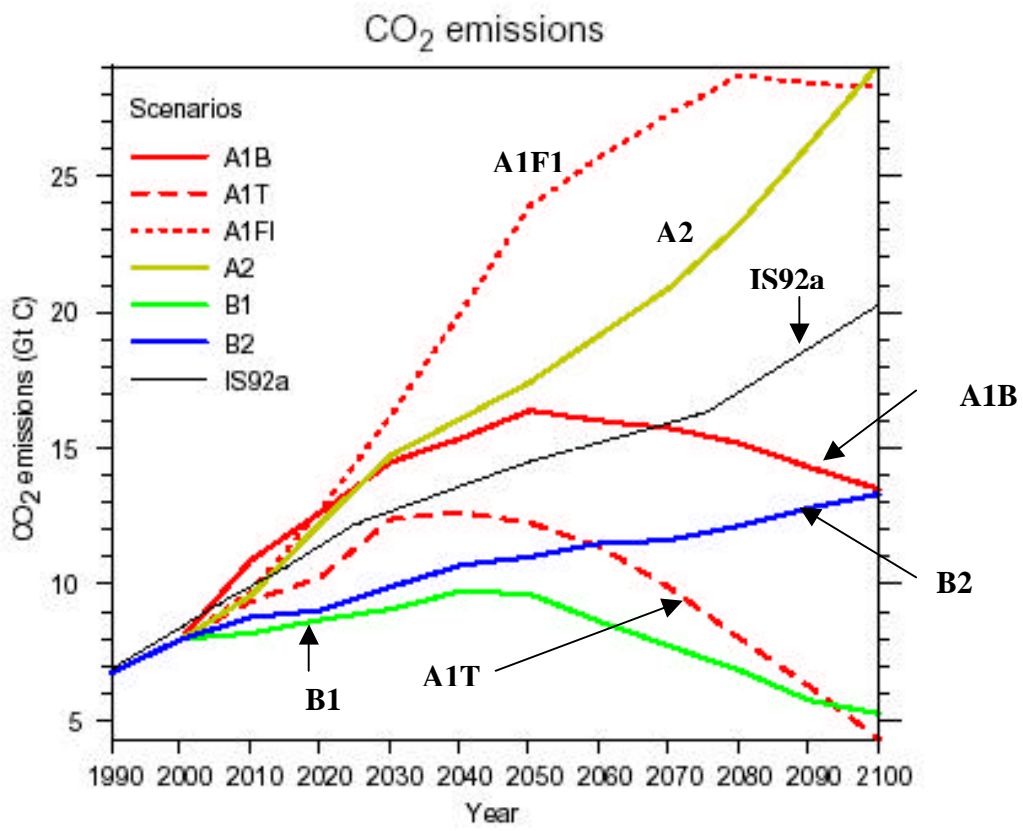
Some Preliminary Insights From the Assessment:

- Discharge from many Arctic rivers has shown a shift toward an earlier seasonal peak in agreement with greenhouse simulations by global climate models. (Lammers et al., JGR, 2001).
- Arctic springtime warming, earlier snowmelt, sea ice thickness reduction and redistribution, and glacier mass balance variations have been linked to the Arctic Oscillation, which in turn appears to be linked to changes in the upper atmosphere.
- Evidence of warming of permafrost is accumulating, and climate models project a continuation of the degradation of permafrost.
- There is widespread evidence of glacier retreat over the past 100 years in the northern high latitudes (refs. in IPSS, 2001).
- The Greenland ice sheet is showing larger areas and duration of summer melt; it is thinning at lower elevations, and shrinkage of the ice sheet is likely as climate warms.
- The consensus of global climate models is that Arctic sea ice coverage will shrink by about 50% by the end of the next century (based on ACIA model output archive).

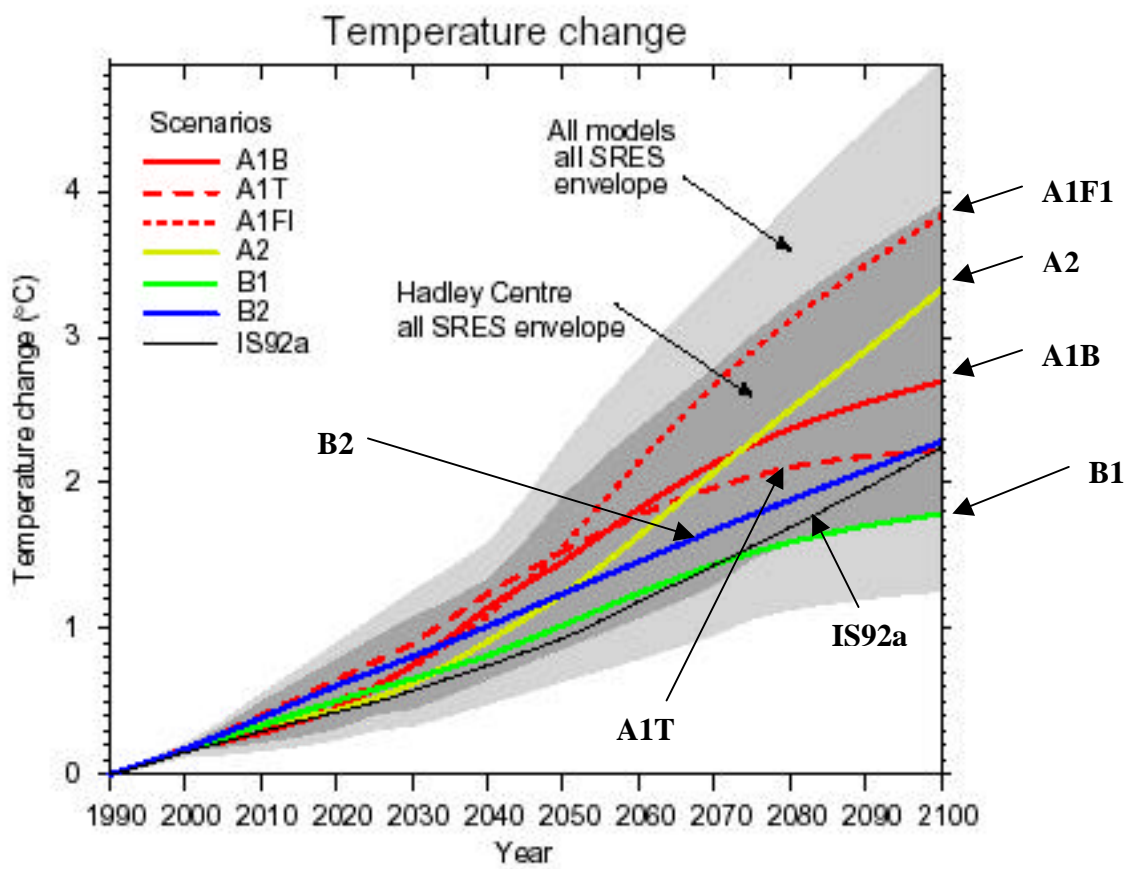
Temperature Reconstructions and Data for Past 1000 Years:



CO₂ Emissions Scenario for ACIA:



Temperature Projections from B2 Scenario for ACIA:



Management and Oversight:

The Arctic Council (AC) and the three sponsoring bodies (AMAP, CAFF, and IASC) have established an Assessment Steering Committee (ASC) to provide an on-going oversight mechanism for the assessment. The members of the ASC include all the lead authors, several scientists appointed by the three sponsoring bodies, and two individuals appointed by the indigenous organizations in the Arctic Council. Further, the three sponsoring bodies have established oversight processes for the ACIA. Finally, the Arctic Council, including its Senior Arctic Officials, provide oversight through progress reports and documentation at all of the AC meetings.

Funding:

The funding of the ACIA is through support by each of the eight Arctic-rim nations, the United Kingdom, with the US providing financial and in-kind support, through the NSF, NOAA, and the University of Alaska to establish a Secretariat at the University of Alaska in Fairbanks. Further, contributions to the ACIA from other Arctic countries have been secured, with each country supporting the involvement of its citizens in the ACIA and through in-kind contributions such as local costs of hosting meetings and workshops.

The Assessment Steering Committee Members:

Robert Corell, <u>Chair</u>	IASC/USA
Pål Prestrud, <u>Vice-Chair</u>	CAFF/Norway
All 18 Lead Authors	As noted above
Snorri Baldursson	Liaison with CAFF/Iceland
John Calder	Liaison with NOAA/USA
Karl Erb	Liaison with NSF/USA
Terry Fenge	IPS/Canada
Rögnvaldur Hannesson	IASC/Norway
Gordon McBean	CAFF/Canada
James McCarthy	Liaison with IPCC/USA
Hanne Petersen	Denmark
Lars-Otto Reiersen	AMAP/Norway
Odd Rogne	Liaison with IASC/Norway
Jan Idar Solbakken	IPS/Norway
Yuri Tsaturov	AMAP/Russia

Secretariat:

Gunter Weller,	Executive Director
Patricia Anderson	ACIA Secretariat/USA
Thomas Murray	ACIA Secretariat/USA

Webpage

The ACIA webpage, which contains details on ACIA, can be found at: <http://www.acia.uaf.edu/>